

## Highest degrees of host specificity even in the inundative biocontrol approach. Response to Cripps et al.

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The response to the long letter, Cripps et al. (2012) wrote against Müller and Nentwig (Plant pathogens as biological agents of *Cirsium arvense* – an overestimated approach? NeoBiota 11:1–24, 2011) can be summarised in three points:

- (1) There are two approaches for biocontrol, classical biocontrol and inundative biocontrol. It is usually accepted that both differ in goals and requirements. In our literature review on the efficiency of various pathogens to control *Cirsium arvense*, we did not consequently mention for which approach which pathogen has been proposed since many articles we reviewed did not discuss this aspect. Moreover, there is a tendency to propose agents with insufficient target selectivity for the inundative method. In fact, both techniques do not represent discrete categories, but rather a continuum.
- (2) Nevertheless, Cripps et al. state that inundative biocontrol agents do not need to be specific. Instead of importing “new species” (they probably mean “alien species” and want to refer to classical biocontrol), they define inundative biocontrol as usage of “already present, often cosmopolitan generalist microbial pathogens”. They recommend this application, call it safe and sustainable, but do not discuss why already present pathogen species shall be applied or why they are not effective. Moreover, this statement shows an astonishing lack of sensitivity to spreading species which are considered to be cosmopolitan, thus ignoring potential safety problems with non-targets.

(3) The most interesting point in this letter, however, concerns the well-known fact that plant pathogens face a lot of problems in reaching the biocontrol market. Cripps et al. list some of them (lack of investor interests, “bureaucratic issues”, “onerous and costly government registration procedures”, cost of production, small size of the market, competition by herbicides) which all may contain a grain of truth. In our review we only briefly touched this topic but mentioned another crucial point which refers, in the case of *Cirsium arvense*, to an obvious lack of host specificity or loss of virulence. We are still convinced on the importance of this conclusion and do not agree with Cripps et al. that host-specificity is not necessary.

Our review is restricted to *Cirsium arvense* and we did not draw any conclusion to other weeds or to biocontrol in general. Biocontrol may have a great future and may indeed be underresearched, but scientists have to be more than careful to avoid unsuitable species introductions. The spread of *Harmonia axyridis* in Europe, even after years of negative experience in the US still a declared inundative biocontrol agent, was a fall from grace which may not happen again. Therefore, it is highly recommendable to demand highest degrees of host specificity even in the inundative approach.